



(12) **EUROPEAN PATENT APPLICATION**

(88) Date of publication A3: **02.01.2004 Bulletin 2004/01** (51) Int Cl.7: **H04Q 7/36**

(43) Date of publication A2: **09.10.2002 Bulletin 2002/41**

(21) Application number: **02006569.4**

(22) Date of filing: **21.03.2002**

(84) Designated Contracting States:  
**AT BE CH CY DE DK ES FI FR GB GR IE IT LI LU**  
**MC NL PT SE TR**  
 Designated Extension States:  
**AL LT LV MK RO SI**

(72) Inventor: **Shibutani, Akira**  
**San Jose, CA 95110 (US)**

(74) Representative: **HOFFMANN - EITLÉ**  
**Patent- und Rechtsanwälte**  
**Arabellastrasse 4**  
**81925 München (DE)**

(30) Priority: **05.04.2001 US 826671**

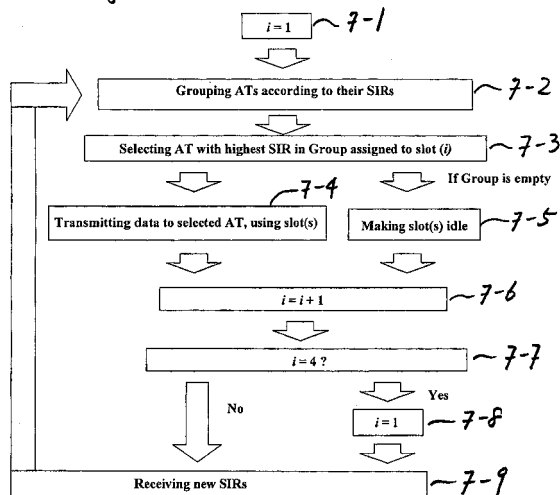
(71) Applicant: **DoCoMo Communications**  
**Laboratories USA, Inc.**  
**San Jose, CA 95110 (US)**

(54) **Method for dynamically scheduling communications to a plurality of receivers over a TDMA channel**

(57) The present invention provides scheduling algorithms that guarantee minimum data transport service for even ATs with poor channel conditions. Data-requesting ATs are divided into a number ( $N_{g1}$ ) of AT groups according to their channel conditions. Also, a recurring sequence of time slots is defined on the TDMA channel and partitioned into a number ( $N_{g2}$ ) of slot groups, where  $N_{g2}$  is made larger than  $N_{g1}$ . Generally, slot assignment according to the present invention is a two-step process. First, in the sequence, the slot groups

are allocated to the AT groups so that AT groups with better channel conditions will receive more slot groups while each AT group will receive at least one slot group. Second, in each AT group, the time slots allocated to an AT group are assigned to the individual ATs in the group. By assigning more slot groups to AT groups with better channel conditions, the algorithm will optimize the overall data throughput. By assigning at least one slot group to each AT groups, the algorithm will guarantee minimum service to ATs with poor channel conditions.

Fig. 7A





European Patent  
Office

EUROPEAN SEARCH REPORT

Application Number  
EP 02 00 6569

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.7)
X	WO 01 17311 A (TACHYON INC) 8 March 2001 (2001-03-08)	1-6,15, 18	H04Q7/36
Y	* page 3, line 11 - page 15, line 20; figures *	7	
Y	----- US 5 914 950 A (LIN YU-CHUAN ET AL) 22 June 1999 (1999-06-22)	7	
A	* column 6, line 15 - column 34, line 24; figures *	1-6,8-20	
X	----- EP 0 975 190 A (HUGHES ELECTRONICS CORP) 26 January 2000 (2000-01-26) * page 45, paragraph 332 - page 46, paragraph 339; figures 27,35,36 *	1-5,9	
A	----- EP 0 986 282 A (MATSUSHITA ELECTRIC IND CO LTD) 15 March 2000 (2000-03-15) * page 3, paragraph 11 - page 10, paragraph 94; figures *	1-20	
			TECHNICAL FIELDS SEARCHED (Int.Cl.7)
			H04Q H04L
The present search report has been drawn up for all claims			
Place of search		Date of completion of the search	Examiner
The Hague		31 October 2003	Geoghegan, C
CATEGORY OF CITED DOCUMENTS			
X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document		T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons ..... & : member of the same patent family, corresponding document	

EPO FORM 1503 03/82 (P04/C01)

**ANNEX TO THE EUROPEAN SEARCH REPORT  
ON EUROPEAN PATENT APPLICATION NO.**

EP 02 00 6569

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on  
The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

31-10-2003

Patent document cited in search report	Publication date	Patent family member(s)	Publication date				
WO 0117311	A	08-03-2001	AU 6800900 A	26-03-2001			
			AU 6889700 A	26-03-2001			
			AU 6933800 A	26-03-2001			
			AU 6934000 A	26-03-2001			
			AU 6936300 A	26-03-2001			
			AU 7072300 A	26-03-2001			
			CA 2384303 A1	08-03-2001			
			CA 2386744 A1	08-03-2001			
			CA 2386745 A1	08-03-2001			
			CA 2386766 A1	08-03-2001			
			CN 1385019 T	11-12-2002			
			CN 1421074 T	28-05-2003			
			CN 1385048 T	11-12-2002			
			CN 1385000 T	11-12-2002			
			EP 1212874 A1	12-06-2002			
			EP 1219130 A1	03-07-2002			
			EP 1221199 A1	10-07-2002			
			EP 1212849 A2	12-06-2002			
			JP 2003524943 T	19-08-2003			
			JP 2003508970 T	04-03-2003			
			JP 2003508992 T	04-03-2003			
			WO 0117171 A1	08-03-2001			
			WO 0116744 A1	08-03-2001			
			WO 0117311 A1	08-03-2001			
			WO 0117117 A2	08-03-2001			
			WO 0117110 A1	08-03-2001			
			WO 0117189 A1	08-03-2001			
			US 6463070 B1	08-10-2002			
			US 6532220 B1	11-03-2003			
			US 6218896 B1	17-04-2001			
			US 5914950	A	22-06-1999	AU 7246698 A	30-10-1998
						CN 1263675 T	16-08-2000
						EP 0974237 A2	26-01-2000
JP 2001519123 T	16-10-2001						
TW 391099 B	21-05-2000						
WO 9845966 A2	15-10-1998						
US 5923650 A	13-07-1999						
ZA 9802973 A	13-10-1998						
EP 0975190	A	26-01-2000	CN 1257382 A	21-06-2000			
			CN 1259803 A	12-07-2000			
			CN 1258137 A	28-06-2000			
			CN 1257356 A	21-06-2000			
			CN 1258140 A	28-06-2000			
			CN 1258145 A	28-06-2000			

EPO FORM P0459

For more details about this annex : see Official Journal of the European Patent Office, No. 12/82

**ANNEX TO THE EUROPEAN SEARCH REPORT  
ON EUROPEAN PATENT APPLICATION NO.**

EP 02 00 6569

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on  
The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

31-10-2003

Patent document cited in search report	Publication date	Patent family member(s)	Publication date	
EP 0975190	A	CN 1258146 A	28-06-2000	
		CN 1257368 A	21-06-2000	
		CN 1260653 A	19-07-2000	
		CN 1259814 A	12-07-2000	
		EP 0975190 A2	26-01-2000	
		EP 0975191 A2	26-01-2000	
		EP 0975192 A2	26-01-2000	
		EP 0975193 A2	26-01-2000	
		EP 0975194 A2	26-01-2000	
		EP 0975195 A2	26-01-2000	
		EP 0975196 A2	26-01-2000	
		EP 0977459 A2	02-02-2000	
		EP 0975197 A2	26-01-2000	
		EP 0975198 A2	26-01-2000	
		JP 2000151650 A	30-05-2000	
		JP 2000059453 A	25-02-2000	
		JP 2000224215 A	11-08-2000	
		JP 2000115262 A	21-04-2000	
		JP 3124760 B2	15-01-2001	
		JP 2000078652 A	14-03-2000	
		JP 2000069095 A	03-03-2000	
		JP 2000059400 A	25-02-2000	
		JP 3378532 B2	17-02-2003	
		JP 2000138693 A	16-05-2000	
		JP 2000106584 A	11-04-2000	
		JP 2000059401 A	25-02-2000	
		TW 432883 B	01-05-2001	
		TW 506225 B	11-10-2002	
		TW 456154 B	21-09-2001	
		TW 506223 B	11-10-2002	
		TW 510993 B	21-11-2002	
		TW 507459 B	21-10-2002	
		TW 506224 B	11-10-2002	
TW 484331 B	21-04-2002			
TW 529311 B	21-04-2003			
-----	-----	-----	-----	
EP 0986282	A	15-03-2000	AU 3171999 A	08-11-1999
		BR 9906339 A	19-09-2000	
		DE 69903110 D1	31-10-2002	
		DE 69903110 T2	23-01-2003	
		EP 0986282 A1	15-03-2000	
		US 2002077064 A1	20-06-2002	
		US 6400929 B1	04-06-2002	
		CN 1263681 T	16-08-2000	
		EP 1122965 A1	08-08-2001	
		ES 2184430 T3	01-04-2003	

EPO FORM P0459

For more details about this annex : see Official Journal of the European Patent Office, No. 12/82

**ANNEX TO THE EUROPEAN SEARCH REPORT  
ON EUROPEAN PATENT APPLICATION NO.**

EP 02 00 6569

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on  
The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

31-10-2003

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
EP 0986282	A	WO 9955112 A1	28-10-1999
		JP 2000049663 A	18-02-2000
		JP 3397779 B2	21-04-2003
		JP 2002374205 A	26-12-2002
		JP 3397780 B2	21-04-2003
		JP 2003023659 A	24-01-2003
		JP 3397781 B2	21-04-2003
		JP 2003023395 A	24-01-2003
		US 2002068534 A1	06-06-2002
		US 2002082039 A1	27-06-2002
		US 6381445 B1	30-04-2002
		US 6366763 B1	02-04-2002
		US 6370359 B1	09-04-2002
		US 6487394 B1	26-11-2002
		US 6597894 B1	22-07-2003
-----			